<u>**REMARKS/ARGUMENTS**</u>

Claims 1-50 are pending in the application. No claims are amended. No claims are canceled, and no claims are added.

<u>CLAIM REJECTIONS--35 U.S.C. § 102(b)</u>

Claims 38-41 and 47 were rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Bohannon et al., "From XML Schema to Relations: A Cost-Based Approach to XML Storage", IEEE ICDE, 2002 ("Bohannon"). This rejection is respectfully traversed.

CLAIM 38

<u>Bohannon does not use statistics to determine how to process a query in the manner</u>

<u>claimed in Claim 38.</u>

Claim 38 appears as follows (emphasis added):

38.   (Previously Presented) A method comprising the computer-implemented steps of:
            gathering, by a database management system, statistics about how many nodes
                within one or more XML resources that are stored in a repository of said
                database management system satisfy certain criteria;
            storing said statistics in said database management system; and
            the database management system using the statistics to determine how to
                process a query that accesses the one or more XML resources.

Bohannon does not suggest or disclose at least the following features: "the database management system using the statistics to determine how to process a query that accesses the one or more XML resources."

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Bohannon is directed to, among other things, describing LegoDB, "a cost-based XML storage mapping engine that explores a space of possible XML-to-relational mappings and selects the best mapping for a given application." (Bohannon, middle of abstract). Claim 38 features, inter alia:

> "the database management system using the statistics to determine how to process a query that accesses the one or more XML resources."

To the extent that Bohannon discloses statistics, statistics are not used in Bohannon to determine how to process queries at all. Statistics are apparently used in Bohannon to determine the best XML-to-relational mapping for *storing* XML data in a relational database. Thus, the limitation "to determine how to process a query that accesses the one or more XML resources" is not satisfied.

The Office Action points to

"(statistics used by optimizer, section 4.2, third paragraph)"

as disclosing the feature of Claim 38 quoted above. The left-hand column of page 8, section 4.2 shows that (emphasis added)

> "The resulting relational schema and the statistics are taken as input by a relational optimizer **to compute the expected cost of computing a query** in the SQL workload derived as above; this cost is returned as the **cost of the given pSchema**."

However, using statistics to compute the expected cost of computing a query in the SQL workload does not suggest or disclose (emphasis added) "the database management system using the statistics to determine **how to process a query** that accesses the one or more XML resources" as claimed in Claim 38. Instead, in Bohannon, the cost "returned as the cost of the given pSchema" is used in the process of determining an efficient configuration for storing XML data in a relational database. The top of the

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left-hand column of section 4.2, page 8, shows clearly that the statistics and relational

optimizer are used in a process where "each of these candidate configurations is

evaluated using GetPSchemaCost and the configuration with the smallest cost is selected

(lines 8-14). This process is repeated until the current configuration can no longer be

improved." An algorithm such as Algorithm 4.1 is used in Bohannon to find an efficient

configuration for storing XML data in a relational database. See Algorithm 4.1, which is

a "Greedy Heuristic for Finding an Efficient Configuration". (Bohannon, left-hand

column of page 8, Section 4.2).

Thus, Bohannon does not suggest or disclose: "the database management system

using the statistics to determine how to process a query that accesses the one or more

XML resources" as claimed in Claim 38. The rejection of Claim 38 is respectfully

traversed for at least the reasons indicated herein.

CLAIM 47

Bohannon does not suggest or disclose formulating a query execution plan in response to a query in the manner claimed in Claim 47 at all

Claim 47 appears as follows (emphasis added):

47.   (Previously Presented) A database system comprising:

an XML data repository within a relational database management system; and

a query optimizer that is configured to receive a database query and, in response to said query, formulate a query execution plan based on computational costs of access paths associated with XML data stored in said repository, wherein said computational costs are based on statistics characterizing an organizational structure of said XML data.

Bohannon does not suggest or disclose at least

"a query optimizer that is configured to receive a database query and, in response to said query, formulate a query execution plan based on computational costs of access paths associated with XML data stored in said repository".

Bohannon does not suggest or disclose formulating a query execution plan at all, because Bohannon is directed to, among other things, finding an efficient XML-to-relational configuration for storing XML data, and therefore there is no need for Bohannon to disclose formulating query execution plans.

The section of Bohannon pointed out by the Office Action as disclosing the quoted feature of Claim 47 is "(statistics used by optimizer to compute costs of query, section 4.2, third paragraph)". (Office Action, top paragraph of page 5). However, that section describes finding an efficient configuration for storing XML data in a relational database. "Each of these candidate configurations is evaluated using GetPSchemaCost and the configuration with the smallest cost is selected (lines 8-14). This process is repeated until the current configuration can no longer be improved." (Bohannon, top paragraph, left-hand column, page 8, section 4.2). Therefore, Bohannon does not suggest or disclose at least the following feature of Claim 47: "a query optimizer that is configured to receive a database query and, in response to said query, formulate a query execution plan based on computational costs of access paths associated with XML data stored in said repository". The rejection of Claim 47 is respectfully traversed for at least the reasons indicated above.

CLAIM REJECTIONS—35 U.S.C. § 103(a)

Claims 1-37, 42-46 and 48-50 were rejected under 35 U.S.C. § 103(a) as being

allegedly unpatentable over Bohannon in view of Bossman et al., Patent No. 7,139,749

("Bossman"). This rejection is respectfully traversed.

CLAIM 1

Neither Bohannon nor Bossman, individually or in combination, suggests or discloses the

features of Claim 1

Claim 1 appears as follows (emphasis added):

1.   (Previously Presented) A method comprising the computer-implemented steps of:

        gathering statistics by a database server about XML resources that are

                stored in a database repository that is managed by the database

                server;

        storing said statistics; and

        in response to a request to the database server for access to one or more XML

                resources from said database repository, the database server **computing a**

                computational cost associated with each of two or more methods of

                accessing said one or more XML resources from said database

                repository, based on said statistics.

Neither Bohannon nor Bossman, individually or in combination, suggests or

discloses at least the features of Claim 1 shown in bold type above. Even if Bohannon

and Bossman could be combined, and even if there was motivation to combine Bohannon

and Bossman, their combination does not suggest or disclose at least the features of

Claim 1 shown in bold type above.

Bohannon is directed to, inter alia, finding an efficient XML-to-relational

mapping for **storing** XML data in a relational database. (See abstract of Bohannon).

Bossman discloses, inter alia, a method, system, and program for tuning a database query. (Bossman, abstract, ll. 1-2). Bossman discloses SQL tuning, which optimizes SQL queries for accessing information in relational databases. (Bossman, Col 1, line 66 to Col 2, line 1). Even if Bohannon and Bossman could be combined, neither reference suggests or discloses at least "computing a computational cost associated with each of two or more methods of accessing said one or more XML resources from said database repository, based on said statistics."

The Office Action on page 6 admits that Bohannon does not explicitly indicate "the database server computing a computational cost associated with each of two or more methods of accessing". The Office Action asserts that Bossman discloses the features lacking from Bohannon. However, Bossman computes estimated costs of access paths for accessing conventional **relational** data. Bossman does not at all suggest or disclose computing estimated costs of access methods for accessing XML resources. Moreover, the computation performed in Bossman is not based on the kind of statistics stored in Claim 1. The statistics in Bossman are not even about XML resources. Statistics in Bossman include, among other things, the size of tables and candidate indexes, and statistics regarding columns. (Bossman, col. 9, ll. 36-49). Claim 1 recites that the statistics upon which the computation is based are, among other things, statistics about XML resources.

Moreover, one of ordinary skill in the art would not combine a reference that teaches how to store XML data with a reference that teaches how to access relational data. Applicant respectfully submits that it is unclear how one of ordinary skill in the art would use statistics about XML resources in combination with the techniques for computing

estimated costs of access paths for accessing conventional relational data disclosed in

Bossman. Column 8, ll. 23-25 in Bossman states "An optimal access plan depends in

part on accurate and complete statistics about physical database objects accessed by the

SQL statement." Column 9, line 36 of Bossman states "The statistics adviser 62 then

determines (at block 206) whether the statistics 36 include all determined important

statistics." However, statistics about XML resources are even not part of the example

"determined important statistics" listed in Bossman, Column 9, lines 38-49 for computing

computational costs. Notably, statistics about XML resources is not mentioned at all in

Bossman. Nor are statistics about XML resources used by the optimizer in Bossman to

compute estimated costs of access paths in Column 8, lines 23-39. Thus, one of ordinary

skill in the art would not contemplate combining the disclosed techniques of Bossman for

accessing conventional relational data with Bohannon's techniques for storing XML data.

In conclusion, neither Bohannon nor Bossman, individually or in combination,

suggests or disclose at least "computing a computational cost associated with each of two

or more methods of accessing said one or more XML resources from said database

repository, based on said statistics", as claimed in Claim 1.

Bohannon also does not suggest or disclose "gathering statistics by a database

server about XML resources that are stored in a database repository that is managed by

the database server;" There is no suggestion or disclosure in Bohannon that a database

server gathers statistics as recited in Claim 1. Bohannon simply discloses that there are

statistics about XML data stored in the so-called "p-schema". (Bohannon, bottom of left-

hand column, p.5). "The statistics are extracted from the data and inserted in the original

physical schema PS0 during its creation." (Bohannon, bottom of left-hand column, p.5).

However, Bohannon does not explain whether these statistics are hand-gathered, gathered

by an external software tool, or some other component. Thus, Bohannon also does not

suggest or disclose at least this distinguished feature of Claim 1.

The rejection of Claim 1 is respectfully traversed for at least the reasons indicated

above.

CLAIM 2

Claim 2 appears as follows:

The method of Claim 1, wherein each of said XML resources is logically
organized in a hierarchy of nodes in which each node is either a container
or a resource, and
**wherein the step of gathering statistics comprises gathering one or more data
from a group consisting of**
**a total number of nodes, in one or more hierarchies associated with one or
more of said XML resources, that are accessible via a path through a
specified node,**
**a total number of containers, in one or more hierarchies associated with one
or more of said XML resources, that are accessible via a path through
a specified node,**
**a total number of nodes, in one or more hierarchies associated with one or
more of said XML resources, that are accessible via a path through a
specified node and that are in a level of said one or more hierarchies
that is immediately under a level of said specified node,**
**a total number of containers, in one or more hierarchies associated with one
or more of said XML resources, that are accessible via a path through
a specified node and that are in a level of said one or more hierarchies
that is immediately under a level of said specified node, and**
**a number of levels, from a root node of one of one or more hierarchies
associated with one or more of said XML resources, at which a
specified node is organized in said one of one or more hierarchies.**

Neither Bohannon nor Bossman, individually or in combination, suggests or

discloses at least the features of Claim 2 shown in bold type above. Neither reference

suggests or discloses wherein the step of gathering statistics comprises gathering one or

more data from a group consisting of numbers as shown in bold type above. For example, one of the numbers shown in bold type above is "a total number of nodes, in one or more hierarchies associated with one or more of said XML resources, that are accessible via a path through a specified node". Neither of the references disclose or suggest gathering data analogous to such a total number of nodes. The top paragraph of the right hand column on page 5 of Bohannon discloses a p-schema that contains a notation of the relative number of "reviews" elements within each element of type "Show", representing that there are 10 reviews per show. However, such notations are statistics regarding the type "Show" **in a p-schema** of Bohannon, and are not statistics with respect to a specified node involved with **an XML resource**, which is XML data. Note that the title of Bohannon is (emphasis added) "From XML *Schema* to Relations: ..." which shows that Bohannon discusses schemas, and does not discuss XML resources that are XML data. Furthermore, in order to use the techniques of Bohannon to find an efficient XML-to-relational mapping, Bohannon does not need to examine actual XML files. Bohanon merely teaches, among other things, examining an XML schema, creating a p-schema that includes embedded statistics regarding that XML schema, and performing transformations on p-schemas to generate a space of alternative p-schemas and corresponding relational configurations. (See Section 4, page 6). Therefore, Bohannon does not suggest or disclose the features of Claim 2 at all. With respect to Bossman, Bossman does not disclose XML resources at all.

The rejection of Claim 2 is respectfully traversed for at least the reasons indicated herein.

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CLAIM 3

Claim 3 appears as follows:

3.   (Previously Presented) The method of Claim 1, wherein each of said XML
resources is logically organized in a hierarchy of nodes in which each node is
either a container or a resource, and
wherein the step of gathering statistics comprises gathering each of
> **a total number of nodes, in one or more hierarchies associated with**
> **one or more of said XML resources, that are accessible via a**
> **path through a specified node,**
> **a total number of containers, in one or more hierarchies associated**
> **with one or more of said XML resources, that are accessible**
> **via a path through a specified node,**
> **a total number of nodes, in one or more hierarchies associated with**
> **one or more of said XML resources, that are accessible via a**
> **path through a specified node and that are in a level of said one**
> **or more hierarchies that is immediately under a level of said**
> **specified node,**
> **a total number of containers, in one or more hierarchies associated**
> **with one or more of said XML resources, that are accessible**
> **via a path through a specified node and that are in a level of**
> **said one or more hierarchies that is immediately under a level**
> **of said specified node, and**
> **a number of levels, from a root node of one of one or more hierarchies**
> **associated with one or more of said XML resources, at which a**
> **specified node is organized in said one of one or more**
> **hierarchies.**

Neither Bohannon nor Bossman suggests or discloses, individually or in
combination, the features of Claim 3 as shown in bold type above. The argument for

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Claim 3 is similar to the argument for Claim 2. Claim 3, however, recites that the step of

gathering statistics comprises **gathering each of the numbers** shown in bold type above.

As discussed with respect to Claim 2, Bohannon discloses statistics regarding XML

schemas, but does not disclose any numbers with respect to XML resources. Thus, none

of the numbers recited in Claim 3 is suggested or disclosed in Bohannon. Bossman does

not disclose XML resources either.

The rejection of Claim 3 is respectfully traversed for at least the reasons indicated

herein.

CLAIM 42

Neither Bohannon nor Bossman, individually or in combination, suggests or discloses the

features of Claim 42

Claim 42 appears as follows (emphasis added):

42.   (Previously Presented) A method comprising the computer-implemented steps of:
in response to a request for access to one or more XML resources from a
database repository within a database management system,
accessing, from said database management system, statistics about
a structure of a hierarchy associated with said one or more
XML resources; and
computing a computational cost associated with each of two or
more methods of accessing said one or more XML
resources from said database repository, based on said
statistics.

The features of Claim 42 shown above in bold type are also features of Claim 1

that have been distinguished from Bohannon and Bossman. The computing step of Claim

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42 is based on statistics about a structure of a hierarchy associated with said one or more

XML resources. Such statistics are not found in Bossman. Applicants respectfully

submit that, analogously with Claim 1, it is also unclear how to combine and use the

techniques disclosed in Bossman for computing estimated costs of access paths for

accessing conventional **relational** data with the statistics of Claim 42, which involve

XML resources. For the reasons discussed above, the rejection of Claim 42 is respectfully

traversed.

CLAIM 48

Claim 48 appears as follows (emphasis added):

48.   (Previously Presented) A system comprising:
        means for gathering statistics by a database server about XML resources that are
                stored in a database repository that is managed by the database server;
        means for storing said statistics; and
        means for computing, in response to a request to the database server for access to
                one or more XML resources from said database repository and based on
                said statistics, a computational cost, by the database server, associated
                with each of two or more methods of accessing said one or more XML
                resources from said database repository.

Claim 48 recites features similar to the features of Claim 1 distinguished from Bohannon

and Bossman. The rejection of Claim 48 is respectfully traversed for the same reasons as

discussed for Claim 1.

REMAINING CLAIMS

        The pending claims not discussed so far are dependant claims that depend on an

independent claim that is discussed above. Because each of the dependant claims include

the limitations of claims upon which they depend, the dependant claims are patentable for

at least those reasons the claims upon which the dependant claims depend are patentable.

Removal of the rejections with respect to the dependant claims and allowance of the

dependant claims is respectfully requested. In addition, the dependent claims introduce

additional limitations that independently render them patentable. Due to the fundamental

difference already identified, a separate discussion of those limitations is not included at

this time.

CONCLUSION

For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Please charge any shortages or credit any overages to Deposit Account No. 50-1302.

Respectfully submitted,

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